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FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

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IN REPLY REFER TO:

March 3, 1992

Jane E. Genster
Assistant General Attorney
National Broadcasting Company, Inc.
1331 Pennsylvania Avenue, N.W.
Suite 930 North
Washington, D.C. 20004

Dear Ms. Genster:

On December 23, 1991, you wrote to me on behalf of NBC concerning insertion of a very low-level operational signal within the active video portion of a television station's broadcast. You seek confirmation that transmission of this signal does not require formal Commission approval because it has no detectable effect on reception of either the audio or video program material.

You refer to the NBC system for inserting this signal as SDTS, for special data transmission system. As described in earlier reports submitted in letters to me, SDTS uses phase shift keying to modulate a carrier that has a frequency of 1.79 MHz and an amplitude of 1.00 IRE or less. To further reduce any possibility that the SDTS signal might be visible, the carrier phase is inverted on a line by line basis. The signal does not occupy any part of the vertical blanking interval. It uses 60 lines of the active video portion of the broadcast signal to convey one bit of data, allowing a data rate of approximately 240 bits per second.

The SDTS signal has been extensively tested through the network's program distribution circuits and the network-owned stations over the past year. My staff was consulted prior to the commencement of that testing and has discussed the reported results with NBC staff. In your letter, previous reports on the testing, and the discussions with my staff, you have made representations that the SDTS signal is indiscernible on all television receivers. In particular, the signal's inclusion in the video portion of the broadcast signal is said to be visually undetectable. Not only does SDTS not impair or degrade the signal of the transmitting station in any way, but no interference to other stations has been caused, and you claim that there is no possibility of such out-of-channel interference.

Based on the results of your testing and your representations, it appears that the SDTS signal is not itself displayed on television receivers. In addition, it apparently does not cause any visible or audible degradation of the broadcast signal, or result in any detectable loss of resolution or fidelity. On this basis, we conclude that it is not a "special signal," and thus it is not covered by the Commission's policy concerning their use as described in a Public Notice dated April 20, 1970. See 22 FCC 2d 779 (1970). There, the Commission expressed concern that "special signals," related to broadcast operation but not intended for use by the public, could cause some degradation of the broadcast signal and therefore they must not be transmitted without specific Commission authorization. Because we find that the SDTS signal does not degrade the broadcast signal in any discernable way, no such authorization is needed.

We also conclude, based on current evidence, that the possibility that one station could interfere with another is not altered by the inclusion of the SDTS signal in either station's signal. However, should such interference occur, or should degradation of the visual or aural signal develop at some time in the future, we expect NBC to immediately inform the Commission of the circumstances, and to take steps to resolve the situation, if necessary by discontinuing transmission of the SDTS signal.

Finally, we note that the existence of your signal within a program does not preclude others from introducing signals in a similar fashion. It would appear that other carrier frequencies than 1.79 MHz could be used, although coordination of such uses clearly would be critical. For this reason, and because the individual television station licensees must retain ultimate control and responsibility with respect to the signal they transmit, broadcasters should be advised by NBC, or the appropriate organization, of the presence of the SDTS signal in the program material the stations will be broadcasting.

Sincerely,

Roy J. Stewart

Roy J. Stewart
Chief, Mass Media Bureau

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Jane E. Genster
Assistant General Attorney

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NBC

BY HAND

December 23, 1991

Roy J. Stewart, Esq.
Chief
Mass Media Bureau
Federal Communications Commission
1919 M Street, N.W.
Room 314
Washington, D.C. 20554

Dear Mr. Stewart:

As you are aware, NBC has recently developed a special data transmission system ("SDTS") that employs a very low level carrier to transmit broadcast-related data within the active video signal. With the knowledge of the Mass Media Bureau, NBC has during the last year conducted over its owned stations extensive field tests of the SDTS that confirm that the transmission of the SDTS signal is visually undetectable. NBC is now confident of the quality and integrity of the system, and would like to establish its use on a nationwide basis. Before doing so, we seek your confirmation of our view that the transmission by television broadcast stations of this signal developed by NBC requires no formal Commission approval.

Technology. The SDTS has been developed to use a signal indiscernible on all television receivers, yet easily recoverable by a simple decoder along the video path. The SDTS technology employs a very low level carrier to transmit broadcast-related data within the active video signal. The carrier's amplitude is sufficiently low to render the signal visually undetectable. In addition, to ensure complete visual concealment, the carrier phase is inverted on a line-by-line basis causing any trace of the carrier to cancel visually. The SDTS signal can utilize the entire picture area for transmission of data; it does not, however, occupy any part of the Vertical Blanking Interval (VBI).

In the current configuration, the system utilizes data 'cells' that each consist of 60 television lines, where one cell represents one bit of data. Transmitting a single bit

of data over multiple lines inherently provides for greater system reliability and immunity to noise. With four cells per television field, the system is able to transmit at the rate of 240 bits per second.

Testing. During the last quarter of 1990, the NBC Engineering Department performed extensive tests to verify that the STDS signal is both undetectable to the viewer and retrievable. To confirm that the signal's transmission would cause no discernible picture degradation, a group of television engineering experts conducted split-screen tests utilizing high-grade video components under a variety of conditions. In all cases, the SDTS signal could not be seen in the picture. Furthermore, the trials revealed that the signal has to be significantly higher than its normal operating level to be detectable at all.

In addition, testing was performed to establish that the data signal could pass without impairment through a broadcast plant and all inter-network transmission facilities. Test results in the lab as well as in the field demonstrated that the signal was robust and practically impervious to degradation during duplication, amplification, and transmission.

After discussing its plans with members of your senior staff, NBC performed during 1991 extensive field testing of the SDTS, first at WNBC-TV in New York City, and later at the five other NBC owned and operated stations in Burbank, Chicago, Denver, Miami, and Washington. Several hundred Public Service Announcements (PSAs), as well as some local news show "openings," were encoded with the SDTS signal for the tests. During the nine months trial period, these encoded segments aired thousands of times over the six stations.

These comprehensive field trials confirmed again that the signal was visually undetectable under any conditions. The tests also confirmed our analysis that the signal would not degrade or impair the signal of the transmitting station in any way. During the entire nine months of testing, no viewers, including the technical staffs of the six stations,

reported any interference or picture degradation from the SDTS signal.

Potential Uses. In NBC's view, the SDTS potentially has a variety of uses. It could be used to automate the now-laborious task of reporting commercial and program carriage information that currently involves the manual compilation, transmission and review of data by the stations, network, and advertisers. It could similarly enhance the efficient operation of a network and its affiliated stations by facilitating continuity monitoring and network signalling.

Authority. NBC believes that the transmission of the SDTS signal is encompassed within the current NTSC authority of the broadcast stations. A comprehensive view of the Commission's rules revealed no provision that would be violated by the signal's inclusion. In addition, because the prior NBC testing has reliably established that the STDS signal is visually indiscernible and thus poses no threat of detectable picture degradation, the signal is not a "special" network signal of the nature requiring formal Commission approval prior to transmission. See Use of Special Signals for Network Purposes which Adversely affect Broadcast Service, 22 FCC 2d 799 (1970).

NBC is prepared at this time to commence the quantity production of SDTS system hardware and to begin nationwide implementation of the system. We await only your confirmation of our view that the SDTS system that NBC has developed can be implemented on a nationwide basis without further proceedings.

Respectfully submitted,

Jane E. Genster

cc: W. Hassinger
W. Johnson